



North American beavers (*Castor canadensis*) can create beneficial aquatic habitat in many watersheds across California, including this urban stream in the city of Napa. Photo: Rusty Cohn, Napa Beavers

Beaver and Process-Based Restoration Build Momentum in California!

by Hannah Wilton¹, Kate Lundquist², and Brock Dolman³

Over the past few months, beavers have captured the media's attention and garnered widespread support amongst California leaders as the next best "climate-solving hero." Indeed, a growing body of research shows that this keystone species can help increase water storage, provide habitat for other species, sequester carbon, and even [create natural fire breaks](#). As the state faces persistent drought, wildfires, and other climate change woes, many are turning

to beaver as a "nature-based solution" that could help mitigate our biodiversity and climate crisis.

Despite their recent recognition, beavers haven't always been regarded with such respect. During European colonization, the fur trade devastated their once-abundant populations across North America. Native *Castor canadensis* were trapped and hunted out of California until, by the early 1900s, there were only an estimated 1,000 left in the state. Though it is no longer legal to recreationally trap beaver in California, up until now, beaver have been perceived

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and managed as a nuisance — they block culverts and irrigation ditches, cause flooding, and cut down trees that people want standing. Landowners still maintain the right to depredate (kill) beavers causing damage.

The historic and ongoing removal of beaver, paired with the concurrent genocide of Indigenous land stewards as well as other legacy impacts (mining, logging, overgrazing), has greatly altered the health of watersheds across California. In 1923, the California Division of Fish & Game (now California Department of Fish & Wildlife) launched an extensive translocation program to repopulate streams and rivers with this helpful ecological engineer. However, since this program ended in 1950, California has not had a dedicated program to restore beaver despite successful efforts in other western states over the past two decades. The loss of keystone beaver along with the removal of large riparian wood and floodplain disconnection have effectively starved California streams of structural complexity and ecological function.

In the words of the [California Process-Based Restoration Network](#), process-based restoration (PBR) is “partnering with nature to recover degraded river and stream catchments by removing impediments to physical and biological processes and harnessing the system’s fluvial and biological energy to do most of the restoration ‘work.’” Partnering with beavers as process restoration agents, or mimicking their dam-building behavior, are great examples of low-tech, cost-effective PBR techniques that can support watershed restoration at the scale and pace necessary to combat the climate crisis. However, many communities in California have not been aware of these restoration solutions and the ecosystem services beaver provide.

In partnership with many restoration professionals, the Occidental Arts & Ecology Center’s (OAEC) [WATER Institute](#) has been advocating for the inclusion of beaver in our watershed restoration efforts for the past two decades. A critical step in building support for beaver restoration was to update and expand our collective understanding of where beavers are native within California. OAEC co-authored [peer-reviewed papers](#) documenting evidence that redefined beaver’s historical range pre-European settlement, and further legitimized the call to protect and restore this native species.



Participants of the Fall 2022 “Build Like a Beaver” training led by members of the Cal PBR Network build instream structures to mimic beaver in Yellow Creek. The training was held on two adjacent Plumas County properties stewarded by the Maidu Summit Consortium, California Department of Fish and Wildlife, Feather River Land Trust and the US Forest Service. For more info go to www.CalPBR.org/training. Photo: Carrie Monahan, The Sierra Fund

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In 2012, OAEC formally launched a [Bring Back the Beaver Campaign](#) to continue educating key stakeholder communities on the benefits of beaver and process-based restoration, while bringing attention to demonstration projects that highlight the efficacy of these practices. We’ve also been advocating on beaver’s behalf at the policy level, partnering with other conservation NGOs and rewilding organizations to help federal and state agencies rethink how we can manage this species to enhance our restoration and climate goals.

There are many ways to restore beaver. For example, where beavers are already present but causing problems, we can prioritize co-existence solutions like flow control devices, tree cages, fence protection, or OAEC’s Beaver Back Saver Device. These non-lethal measures can help mitigate conflict, while keeping beavers *in situ* to continue providing enormous benefits to our watersheds.

Restoration practitioners can also enhance existing beaver habitat through various strategies, such as planned grazing regimes or riparian fencing to reduce grazing competition. Adding structural complexity to a system with hand-built instream structures, like beaver dam

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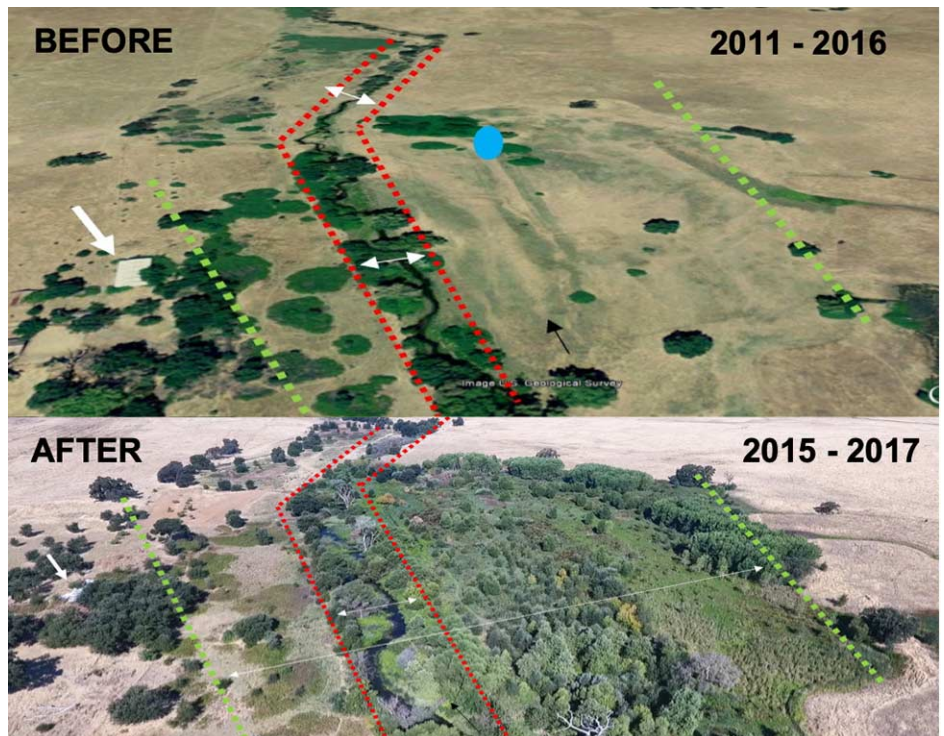
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analogues (BDAs) and post-assisted log structures (PALS), can have a similar effect and even encourage beavers to return to places they have yet to repopulate. In environments that aren't suitable for beaver, we can honor their ecological genius and mimic dam-building activity through process-based treatments and, where appropriate, relocate them to their former range. Holistic approaches to beaver restoration are outlined in OAEC's *Beaver in California: Creating a Culture of Stewardship, the Beaver Restoration Guidebook, and the Low-Tech Process Based Restoration for Riverscapes Design Manual*, which also offer helpful tools for planning through to implementation.

Those interested in learning more about how to integrate these techniques can learn from the work of the recently formed [California Process-Based Network](#). The WATER Institute and other members of the network have partnered with dozens of land owners and managers, NGOs, tribes, communities, and agencies to model these strategies across the state. Our collaborations, as well as other case studies from across the arid West, have revealed incredible results. We've seen overgrazed, dry, and eroding [river systems transform back into green biodiverse oases](#), the rapid regrowth of riparian vegetation in meadows and wetlands, and imperiled species take refuge in beaver habitat. Cities have adopted co-existence strategies and embraced their beaver neighbors, while transportation and [water agencies have installed innovative solutions](#) to mitigate flooding issues while preserving beaver habitat. These pilots have played a key role in building momentum across California by offering stakeholders tangible experiences of beaver and process-based restoration and an ability to see the landscape effects unfold over time.

Last year, the WATER Institute, in consultation with Jennifer Fearing of Fearless Advocacy, coordinated a massive show of multi-stakeholder support with more than 100 conservation, agricultural, business, and tribal partners to ensure beaver and process-based restoration would not be left out of the statewide climate conversation. As a result, both were included in the California Natural Resources Agency's (CNRA) [Natural and Working Lands Climate Smart Strategy](#) as key nature-based solutions.

This momentum ultimately culminated in the California State Legislature approving the Governor's June [budget proposal](#) that provides funding to the California Department of Fish and Wildlife (CDFW) to launch a new statewide Beaver Restoration Program to guide the restoration and management of the species. CDFW's new program will fund five permanent staff members to develop a Beaver



The Placer Land Trust's riparian restoration project at Doty Ravine Preserve near Lincoln, CA is a great example of how learning to live and actively partner with beaver can help achieve many restoration goals at a fraction of the cost of mainstream restoration techniques. By reinforcing the beaver dams, adding more channel spanning structures and giving the beaver more access to the floodplain by breaching two levees, project partners were able to increase the wetted width of a stream by 1,000% in less than 5 years. *Images: Damion Ciotti, US Fish and Wildlife Service*

Management Plan and carry out a full suite of restoration practices including co-existence and relocation. The significance of this moment was recognized by major media outlets including, *The New York Times*, the *Los Angeles Times*, the *San Francisco Chronicle*, *The Globe and Mail*, and *Mother Jones*.

For OAEC and the many other organizations that have worked for decades to shift the narrative on beavers and remove obstacles to restoration, the species' newly acclaimed recognition represents a major "watershed" moment in California. With a renewed commitment from our state agencies and increases in state funding and regulatory efficiency through the [Cutting the Green Tape Initiative](#), California is poised to increase the pace and extent of ecological restoration at a scale heretofore unseen.

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